

BIBLIOGRAPHICAL NOTICE.

Naturhistorisk Tidsskrift (Journal of Natural History), edited by Prof. T. C. SCHJÖDTE at Copenhagen. Third Series, 1861–1864, vols. i. & ii. [O. Rink, *On Watercourses under the Inland Ice in Greenland*; Krøyer, *Contributions to Northern Ichthyology and Contributions to the History of the Parasitic Entomostraca*; O. Mörch, *Revisio critica Serpulidarum*; R. Bergh, *Campaspe pusilla, n. g. (fam. Dotidæ, trib. Dendronotidæ)*, and *Anatomy of Sancara quadrilateralis, n. g. (fam. Pleurophyllidiæ)*; Meinert, *The Danish Species of Forficula*; J. Fisher, *Observations on Danish Birds*; Schjødte, *The Danish Cerambyces, Larvæ of Coleoptera, &c.*]

SINCE our first notice of this periodical, after its revival by Professor Schjødte (*Ann. & Mag. Nat. Hist. ser. 3. vol. x. p. 370*), the editor has succeeded in completing two large volumes, of 558 and 579 pages of text, accompanied respectively with fourteen and twenty engraved plates—a result which is not only a proof of the editor's zeal and enterprise, but, consisting as these volumes do exclusively of original treatises by Danish authors, also affords a most gratifying testimony to the existence of a vigorous spirit of independent research in the small scientific world of Denmark. Our former notice had reference only to the contents of the first part of the first volume; the contents of the following parts are indicated above. Of Prof. Schjødte's treatise on the Danish Cerambyces, which, perhaps, on account of the truly philosophical handling of the subject, occupies the foremost place, the main part has been translated in the March Number of this Journal, to which we therefore refer, still postponing our notice of the treatise on the larvæ of Coleoptera till the continuation has appeared, which is promised in the first part of the third volume.

The two papers heading the list given above have reference to Greenland, which ever since the days of Otto Fabricius has proved an inexhaustible mine to Danish naturalists. The *terra firma* of Greenland certainly offers but little reward for the explorations of zoologists or botanists; but the geographical and geological aspect of the country has many points of interest, whilst the sea literally teems with fishes and other marine animals.

Mr. Rink, the author of the first-mentioned paper (vol. i. part 2, 1862), is well known to English arctic explorers, and has had great opportunities of study during his long stay in Greenland as a government inspector. The question he proposes to solve is this:—What becomes of the great quantity of water generated by the melting, during the summer, of ice and snow in the interior of Greenland? The numberless rivers or “elv”s in the islands and peninsulas along the shore drain merely these outlying parts; and although some of these small rivers, rising in the peninsulas, may to some extent be fed from the ice of the interior, yet by far the greater part of the water there accumulated must find some other outlet. It is obvious that the icebergs carry off a part in the shape of ice, but it is easy to

see that only the smaller portion can be thus accounted for. The whole area of Greenland is estimated at 16,000 Danish square miles (one Danish square mile equalling about 23 English square miles), of which 10,000 are supposed to lie on the western slope of the central chain of mountains. If, now, a line is drawn along the heads of all the great fjords or bays, this will cut off the islands and peninsulas (altogether about 1600 Danish square miles), leaving more than 8000 square miles as the extent of inland ice west of the supposed central chain. The number of ice-fjords, or bays in which the inland ice reaches the sea and breaks up into icebergs, does not exceed fifteen, of which many evidently correspond to inland valleys of but moderate extent, whilst the large ice-fjords must correspond to valleys so extensive that, in southern latitudes, they would feed rivers as large as the Thames. Assuming that, in Greenland as elsewhere, only one-third of the rain and snow would be carried into the sea by the rivers, and assuming also the rain (snow)-fall to be, at an average, all over Greenland only one-third of what it is in Julianehaab (that is, about 12 inches), there would nevertheless be water enough left to form considerable rivers. But, however difficult it may be to calculate accurately the quantity of ice floating out of a large ice-fjord in the course of the year, the calculation may be carried far enough to show that it cannot represent more than a fraction of the water which, somehow or other, must be carried into the sea from the interior. From this consideration Mr. Rink concluded, long ago, that there must be large rivers at the bottom of these valleys, draining the inland ice which fills up the valleys, hides these rivers, and gives to the interior of Greenland the false aspect of a plateau. These hidden rivers of course terminate at the true heads of the fjords, which, however, cannot be observed closely, because the glaciers or outrunners of the inland ice reach so far into the fjords that their fronts, though only about 100 feet above the water, have nevertheless often 1000 feet real height, the remainder being concealed in the deep water in which the head of the glacier is suspended, gradually advancing, and breaking up. If this supposition is true, the fresh water must be expected to rise in the fjord in front of the glaciers; and this is actually the case. At a little distance from the extremity of the glaciers, there is invariably a place where the water is very much disturbed, bubbling and whirling; and clouds of gulls are continually hovering over these places and diving for prey. The Greenlanders call these places "springs;" and that their true nature is as supposed by Mr. Rink seems to be shown by the existence, at the Godthaabs Fjord, of a freshwater lake, an English mile in diameter, at some distance inside the edge of the glacier, which periodically, though not regularly, fills and empties itself. When it is filling, the nearest springs in the fjord are comparatively inactive, but when it empties itself (generally very suddenly) the movement in the sea is so much increased that it is perceptible as far down the fjord as 13 English miles from the glacier.

The same phenomenon of a lake periodically emptied through canals in the ice has been observed at Sermiliarsuk and Nasarliik,

two ice-fjords under 61° and 62° ; but there, as elsewhere, it is impossible to approach the "springs" in boats, on account of the falling ice. Mr. Rink adduces several other considerations in favour of his view,—for instance, that the thickness of the ice in the valleys of the interior in many places must reach 1000 to 2000 feet, and consequently prevent the freezing of the water at the surface of the earth; that the only reason why the glaciers on the islands and the peninsulas do not reach the sea, and cover the rivers, as the inland ice does, is the small extent of the valleys in which they are formed, &c. But this must suffice to show the bearing of his views and the arguments by which they are supported. Two maps accompany the treatise, both designed and engraved by a Greenlander.

Dr. Kröyer's paper on the Greenland species of *Liparis*, *Gymnelis*, *Lumpenus*, *Lycodes*, and *Stichæus* must, to some extent at least, be considered as an instalment of those descriptions to the plates of Gaimard's 'Voyage en Scandinavie' which are not found in the text of that work, but which Dr. Kröyer has intimated his intention of communicating through the 'Naturhistorisk Tidsskrift.' Of the fourteen species here described, nine are illustrated in Gaimard's work. The descriptions of all, being given in Latin, with the author's usual care, require no further commentary; and we need hardly do more than enumerate them. Of *Liparis* Dr. Kröyer mentions five species as belonging to Greenland—*L. Fabricii*, Kr., *L. tunicata*, Reinhardt, *L. Montagui*, Don, *L. lineata*, Kr., and *L. Reinhardi*, Kr. The last of these has been described by Reinhardt, sen., who has contributed so largely to the Greenland fauna, as *L. gelatinosus*, and as identical with the species described as *Cyclopterus gelatinosus* (from Kamtschatka) by Pallas. Dr. Kröyer, however, is of opinion that Pallas's species is altogether distinct, although it agrees with the one described by Reinhardt, and which Kröyer proposes to name *Reinhardi*, in certain peculiarities which remove them both so far from all other species of *Liparis* as to necessitate the formation of a new genus, for which the name *Careproctus* is proposed. These peculiarities consist in the smallness of the sucking-disk, the place of the anus much nearer the mouth, entailing a different shape and position of the inner parts, the shape and position of the pectoral fins, &c. *Gymnelis viridis*, O. Fabr., appears to be one of the commonest fish in Greenland, but does not even reach Iceland or the shores of Hudson's Bay. Dr. Kröyer mentions four species of *Lumpenus* from Greenland, viz. *L. aculeatus*, Rhdt., *L. gracilis*, Rhdt., *L. Fabricii*, Rhdt., and *L. medius*, Rhdt.: he preserves the genus *Lumpenus* as distinct from *Clinus*, though its original characters have proved rather vacillating; but he has not adopted the division of it (proposed by the American ichthyologist Gill, without indication of characters) into three new genera, *Leptoclinus* (*L. aculeatus*), *Centroblennius* (*L. gracilis*), and *Lumpenus*. Dr. Kröyer observes, however, that Reinhardt, sen., has shown long ago ('Transactions of the Royal Danish Society, division of Natural History, vol. vii.) that the species may be distributed into three groups (with which Mr. Gill's new genera coincide), according to whether they have merely maxillary teeth or

palatal teeth as well, &c. Dr. Kröyer doubts the identity of *L. nebulosus*, Gill, and *L. gracilis*, Rhdt., but vindicates, in case they should prove identical as Mr. Gill supposes, the right of priority of Reinhardt's name. For the sake of comparison, Dr. Kröyer introduces a definition of *L. lampetræformis*, Wahlb., from Iceland. Of *Lycodes*, Rhdt., Dr. Kröyer describes two species from Greenland, *L. perspicillum*, Kr., and *L. nebulosus*, Kr., which he had shortly indicated already in 1844: three Greenland species had been described before by Reinhardt (*L. Vahlü*, *L. reticulatus*, and *L. seminudus*); so that now five species are well established. The paper concludes with a careful diagnosis of the genus *Stichæus* proposed a long time ago by Reinhardt, and descriptions of two species, *S. præcisus*, Kr., and *S. punctatus*, Fabr.

Dr. Kröyer's paper on "Parasitic Entomostraca" (volume ii. Nos. 2 and 3, 1863-1864, p. 75-426) contains the descriptions of nearly one hundred new species, illustrated by eighteen plates, and is, in fact, a kind of supplement to the treatise published by him about twenty-seven years ago in the earlier volumes of the 'Naturhistorisk Tidsskrift,' whereby he gained so prominent a place as an authority on the history of these curious animals. An enormous amount of material has accumulated since then in the Museum of which Dr. Kröyer has the charge; and although other naturalists in the mean time have described some of these new species, a considerable quantity is still left for Dr. Kröyer to publish. The author still retains Milne-Edwards's classification in its main points; he acknowledges that a reform is necessary, but looks to the ability of the celebrated French naturalist for the accomplishment of this task. He reminds us that Milne-Edwards himself has indicated such improvements as the union of Copepoda and Siphonostoma, and makes use of the opportunity for praising the truly scientific spirit in which great savans, the pillars of science, often abstain from reforms, of which they discern the principles and outlines, but for which the proper time has not yet arrived, thus preferring rather to serve the good cause loyally than to get honour to themselves by perhaps plausible but immature reforms. Dr. Kröyer's expressions on the mania for new systems are worth quoting. He alludes to the German proverb, "When the kings are building, the carters are busy," and says, "that many zoologists seem to have taken a fright lest they should be accounted mere scientific carters if they confine themselves to descriptions. In order to gain for themselves a higher rank, they all make systems, or at least stick some rag of systematic purple to their descriptive papers. The crowd of systems, one more deformed than the other, is so overwhelming that one is tempted to say with Juvenal, 'Semper ego auditor tantum nunquamne reponam?' and to make systems one's self, merely in revenge." It is indeed but too true that naturalists of a certain school, carrying their abhorrence to mere specialities too far, seem to forget that the only solid foundation of all science is accurate description of careful and well-planned observation; that when the phenomena are accurately observed in all essential points, and not till then, the true theory suggests itself;

but that to observe accurately, to direct the observation to the really essential points, and to describe perfectly are the most difficult of all arts. Dr. Krøyer rejects the distribution of Copepoda, proposed by Professor Steenstrup and Dr. Lütken (in the Transactions of the Royal Danish Society of Sciences, division of Natural History, fifth series, fifth volume, 1861), into three groups according to whether the females have but one external oviduct, or two such containing rows of round eggs, or, finally, two external oviducts containing but one row of disk-shaped eggs. To this classification Dr. Krøyer very properly objects that the groups thus formed do not correspond to any typical or important peculiarities of structure, nor does it even fulfil the requirements of a mere registration of species, as it applies only to the females, and as there are not a few Copepoda without any external oviducts at all. It may indeed be said with good reason that the males, preserving as they do the original type more purely, would afford better characters for groups and genera than the females, of which the often monstrous deformations are chiefly dictated by biological considerations. Dr. Krøyer, in speaking of Lernæopodina, points out how well the generic types within that group are exhibited by the males, and he insists more than once on the merely temporary character of systematic divisions founded on females only. With regard to Thorell's proposition (in the Transactions of the Royal Swedish Society of Sciences) for a division of the whole order, which he calls Copepoda, into Gnathostoma (with free mandibles), Pæcilstoma (without mandibles), and Siphonostoma (with mandibles enclosed in a tube), Dr. Krøyer acknowledges that it proceeds on sound principles, but considers that our knowledge of this order is still too limited as yet for the carrying out of such a classification. Faithful to his principles, the author limits himself entirely to descriptions and subordinate points of classification. For the use of those who are not conversant with the Danish language, there are very full Latin extracts of descriptions, definitions of new genera (of which nine are proposed), and also a Latin explanation of the plates. We shall draw attention to a few particulars. The number of newly described species is ninety-six, of which one has been named by Fabricius *Condracanthus radiatus*, F.; one, *Peniculus clavatus*, may coincide with Müller's *Lernæa clavata*; thirteen others have been obtained by exchange from the Museum of Vienna, named, but not described by Kollar, whose names have been preserved; eighty-one are collected and named by Dr. Krøyer. It may not be superfluous to observe that the species described in this paper as new do not coincide with any of those described by Professor Steenstrup and Dr. Lütken, except in the case of *Silenium polynoës*, Kr., identical with *Herpyllobius arcticus*, Str., which latter name will have to be cancelled, as the whole description, &c., is founded on an unfortunate fundamental mistake. Dr. Krøyer opposes the theory of Zenker, that *Argulus* should either be united to Branchiopoda or form a separate order; and his views concerning the homologies of the appendices seem to remove the principal difficulties in the way of deciding the place of *Argulus* in the system. What Milne-Edwards describes as "un

appendice sétacé et grêle" of the hook-shaped antennæ is for Dr. Kröyer the first pair of antennæ, removed further back; and the hook-shaped organs described by Milne-Edwards as the sole pair of antennæ Dr. Kröyer consequently describes as a second pair. These organs correspond in shape and place entirely with those organs in *Caligus* which in Milne-Edwards's description are counted as the first pair of footjaws; and Dr. Kröyer therefore, in opposition to Milne-Edwards, describes them as a second pair of antennæ also in *Caligus*. What Milne-Edwards describes in *Argulus* as "une seconde paire d'appendices antenniformes" represent, according to Dr. Kröyer, the first pair of ordinary feet, occupying a place somewhat more advanced and removed to the sides away from the mouth than in *Caligus*. The correctness of this view is confirmed by the circumstance that the sucking-cups which immediately follow them, evidently, as the development of young *Argulus* and the analogy of *Gyropeltis* show, correspond to the second pair of feet in *Caligus*. The author considers the fork-shaped organ observed in *Caligus* behind this thick second pair as a deformed pair of feet, so much the more as it is supported by a separate and independent joint of the body. Both *Argulus* and *Caligus* will thus appear to have seven pairs of feet, exhibiting a strict parallelism. The so-called tail in *Argulus* corresponds, according to Dr. Kröyer, merely to the so-called genital joint in *Caligus*, containing as it does the organs of generation: the real tail is quite rudimentary in *Argulus*, but is nevertheless represented—namely, by the appendages described by Milne-Edwards as "une paire d'appendices de forme ovulaire" (p. 443). In conclusion, the author adduces the circumstance that the sting placed in front of the beak in *Argulina* has nothing to do with the organs of the mouth, but is rather to be compared to the poisonous sting of *Cyclopsine Castor*, &c.; that several Siphonostoma, such as *Notodelphys* and *Doropygus*, resemble *Argulus* in being without external oviducts; and that the single eyes placed in a triangle are met with both in free Copepodes (*Sapphirina*) and in larvæ of the parasites, from all of which he concludes that there is no reason for making a new order of Argulini, or separating them from Siphonostoma. He describes three new species of *Argulus* from America, raising the number of species in the group of Argulini to thirteen, of which eleven are American—from which it should seem as if it belonged principally to the New World.

There are, upon the whole, a great many American species amongst those which are described in this paper; and in mentioning three new species of *Chondracanthus* from Valparaiso, the author alludes to a parallelism, observed by him before, between the fauna of North Europe and of the littorale of Chili. Dr. Kröyer abandons as untenable, on account of intermediate forms (of which he describes some, particularly *Alebion Carchariæ*, Kr.), the distinction between Caligini and Pandarini. He preserves the genera *Lepeophtheirus*, Nordm., and *Sciænophilus*, Van Ben., which Steenstrup (*l. c.*) has proposed to suppress; but prefers to reunite *Calistes*, Don., and *Dysgamus*, Steens., with *Trebisus*, Kr. (*Synestius*, Steens.), and *Parape-*

talus, Steens., with *Caligus*. There are several interesting observations on the development of Caligini. At first the young larvæ have only two pairs of appendages; but after changing skin their form becomes more elongated, and they acquire a third pair; they go, probably, through a further series of transformations before fixing themselves, but these are at present unknown. Of several species the Chalimi or fixed larvæ have been observed—those of *Lepeophtheirus Hippoglossi* through three different stages. In the first stage (length $\frac{5}{8}$ '''') the genital joint showed two pairs of appendages, or perhaps one double-oared pair; in the second stage (length $1\frac{1}{4}$ ''') these appendages had disappeared, the genital joint and the tail were still shorter in proportion to the fore part of the body, the “fork” was not yet visible; nor could this be observed in those belonging to the third stage (length 2'''). As, however, the smallest adult females are 5''' long, several transformations are still to be observed. Dr. Kröyer’s observations on the Chalimi of *Caligus curtus*, *C. Gurnardi*, and *Trebius caudatus* were quite analogous. Of *C. Cheilodactyli* larvæ were observed very nearly of the same size as the adults. Neither of the “fork” nor of the generative organs was the least vestige distinguishable; but the sucking-cups had begun to form themselves. The organ of fixation, which does not grow in proportion with the larva, and of which the place is discernible in all adult *Caligi* just behind the frontal emargination, shows rather a complicated structure, and distinct variations in different species, so that these may be recognized by it. The young of *Læmargus muricatus* and *Cecrops Latreilli*, which have been observed shortly after assuming the adult form, show some remarkable differences, particularly in the fact that the same piece which in adult Caligini is described as the frontal piece presents itself here as a distinct *ocular segment* or joint, which afterwards disappears, principally owing to the growth of the second pair of antennæ: it exhibits two rather large eyes, which of course disappear with it. To this ocular segment the remains of the organ of fixation were attached, proving that this segment corresponds to the frontal piece of an adult *Caligus*, though this never carries eyes. In the structure of the adult Caligini certain diminutive spines on the concave side of the second hook-shaped antennæ, as well as on the hooks of the second pair of feet, and which are in connexion with extensive glandular (poisonous?) apparatus, may be particularly mentioned. The glands which feed the hooks of the second pair of feet are situated close under the dorsal shield, and are particularly easily distinguished in *Læmargus*, where they have a milky colour, and shine through the shield. Their structure is convoluted; and Dr. Kröyer has followed their ductus, which forms a larger reservoir in the claw itself, to their termination in a very diminutive spine on the concave side of the hook. Dr. Kröyer also recommends *Læmargus muricatus* for observing the copulation. As is well known, the males remain attached to the female even after death, by means of their hooked antennæ and feet; nor would a less secure adhesion suffice, for the work of protruding the spermatophores, and fixing them, one to each of the

vulvæ, takes a long time. At the conclusion of his paper Dr. Kröyer describes three dubious animals belonging to the class of Entomostrea, of which particularly one, named *Pegesimallus spiralis*, is so different from any known genus, in some respects reminding one of the Annelide type, as fairly to puzzle the most ingenious divination.

The habits of the common Earwig, principally known from the work of De Geer, have been made the subject of renewed investigation by Dr. Meinert. According to his observations, the eggs (30-70) are laid in the autumn, as early as the beginning of October, though in some cases only in the following spring. They are placed all in a heap under bark or stones, in holes often dug by the mother, who places herself over and defends them in danger. Dr. Meinert found that when he dispersed the heap the mother collected it again; and once he saw an earwig covering with her body a hole filled with quite young larvæ, and keeping at bay for a considerable time a party of yellow ants which had got access to her hiding-place on the removal of the protecting stone. Although earwigs do occasionally use their forceps for pinching, and with no mean force, this did not constitute her mode of defence; but whenever the ants in crawling about came near the extremity of the forceps, she hurled them away by a quick movement of that organ. At last she was obliged to leave her brood in the power of the ants. Another time Dr. Meinert had three female earwigs, each with a young family, in captivity under the same shade: two of the mothers having been removed, their young sought and received protection from the third and remaining; but when she also had been removed, they all separated and made good their escape. The larvæ appear in the spring, and have generally six-jointed antennæ; some however have eight joints in their antennæ, even before leaving the egg, in which case Dr. Meinert supposes that the first change of skin has taken place in the egg, as the points of the tarsi and palpi were found encased in a loose membrane. The skin is changed several times, the third joint of the antennæ each time dividing itself into three new joints, so that the number of joints is increased with two each time; the pupa has twelve, the imago fourteen joints. The cases in which the wings of the imago are formed in the pupa are coalescent along the middle. Both larvæ and pupæ possess a pair of large fœtid glands, of which the ducts terminate at the root of the forceps, one on each side; they are largest in the pupa, but disappear in the imago, where they are replaced by two pairs of smaller flat glands, of which the external orifices are situated at the back of those small knobs or ridges observed by Léon Dufour and Westwood on the second and third dorsal segments. The only external distinction between the sexes in the pupa consists, according to Dr. Meinert, in a light-coloured line along the middle of the 7th and 8th ventral segments in the female; and Fischer's statement, that even in larvæ and pupæ the sex may be recognized by the number of joints in the abdomen, is therefore erroneous. Dr. Meinert asserts that this number is the same in both sexes, as numerous dissections have proved to him. He has also observed the copulation, which is performed in a curious manner. The male is not on

the back of the female, but behind her; and the position of the two parties is such as if the male had originally been on her back, but had fallen off on his own back. If one of them stands on the ground, the other lies on its back; the act can therefore only be performed between loose bark and the wood, or in other such localities, where they can fix themselves in inverted position to opposite surfaces, blades of grass, leaves, or other points of support. Dr. Meinert has several times seen it performed, and always in such positions. He denies that the forceps are used *in copulâ* for any purpose; they are simply laid along the respective ventral surfaces. He affirms that earwigs, compelled by hunger, attack and devour one another. The number of abdominal segments in *Forficula* has been very differently stated by different authors, and is of importance with regard to the question whether the abdominal segments in insects exhibit a constant number and homologous parallelism in their modifications, particularly in the service of generation. Dr. Meinert maintains that the number is the same in both sexes and in all stages of development—namely, nine besides the segmentum mediale (Schjödte, = segment médiaire, Latreille), which in the larvæ is only represented by a dorsal shield, and which Dr. Meinert considers to be the true first abdominal segment—a necessary consequence of Prof. Schjödte's discovery of the true stigmata mesothoracica in Hymenoptera*. The apparent sexual difference of two abdominal segments less in the female than in the male,

* The principal objection to Latreille's theory of the segment médiaire was hitherto afforded by the position of the large spiracles at the back of the thorax of Hymenoptera, which were always counted as the second pair. But since Prof. Schjödte has discovered the true second pair in the same place as in Coleoptera, behind the epimera mesothoracica, where they are easily overlooked, as they are open only during the flight, this objection has been completely removed. The large spiracles in question in the so-called metathorax of Hymenoptera evidently correspond to those found in Coleoptera between metathorax and abdomen, and which Schjödte prefers to call spiracula metathoracica (not abdominalia^m paris), because their structure and size principally depends on the development of the organs of the thorax, particularly of the elytra. According to Schjödte, the whole matter stands thus:—The first abdominal segment develops itself differently from the neighbouring segments according to the following rule:—

1. The ventral shield is reduced in size in proportion as the third pair of legs become more powerful, because the coxæ, as they increase in size, absorb a proportionate part of the space which otherwise would be occupied by the first ventral shield. In some cases even a couple of the following segments are similarly reduced.

2. The dorsal shield of the first segment of the abdomen (segment médiaire, Latreille; segmentum mediale, Sch.) consequently alone remains, filling up the space above the third pair of coxæ, and necessarily conforming to the hind part of the thorax in shape and size. Another necessary consequence of the rudimentary state of the ventral shield of the true first segment of the abdomen is this—that, in the case of an abdomen petiolatum, the petiolus is formed by the *second* abdominal joint; and the thinner the petiolus is where it articulates on the first abdominal joint, the more must this first segment (segmentum mediale) separate itself from the abdomen and unite itself to the thorax.

Dr. Meinert explains by the supposition that the vagina has been placed behind the sixth instead of behind the eighth ventral shield; and he considers certain chitinized parts between the vagina and anus as the vestiges of the reduced seventh and eighth ventral shields, the lateral parts being more clearly discernible than the central ones. Of course the dorsal parts of these segments must be similarly reduced. The two triangular plates which Mr. Westwood explains as the bifid last ventral shield are explained in the same way by Dr. Meinert, who counts them as the ninth ventral. They are to be found not only in the female, where Mr. Westwood discovered them, but also in the male, partly hidden by the ventral shield of the eighth segment. This view differs from that of all other authors, also from that of Lacaze-Duthiers, whose whole account is vitiated by the strange mistake of counting seven whole segments in front of the vagina, whereas there are only six. Duthiers's last dorsal shield, "endecato-tergite," first observed by Léon Dufour, is, according to Meinert (who proposes to call it the "anal" plate, and recommends it for the distinction of species), only a chitinized part of the membrane extending between the roots of the forceps; it consists of two parts. The Latin *résumé* at the end of this paper contains the results of the author's careful investigation of the sexual organs of the male, and there is also a Latin explanation of the plate which illustrates their structure.

M. Mörch's revision of Serpulidæ has been occasioned by, and is in fact a kind of necessary supplement to his paper on Vermetidæ (Proc. Zool. Soc. 1861-1862). The similarity between the shells is so great that hardly any character can be considered unconditionally reliable for their distinction. *Dentalium* has an anal orifice, as well as any Annelid; and though the opaque cretaceous shells of most Serpulidæ may be easily distinguishable from the internally smooth and shining shells of most Vermetidæ, the semitransparent shells of several species of *Placostegus*, *Ditrypa*, and *Spirorbis* have a parallel in that of *Siphonium Gæderopi*, at least in young specimens. Neither sculpture, nor shape, nor colour distinguishes the shells sufficiently well, nor does the assumed constant absence of internal transverse divisions; for they are, as Professor Steenstrup has shown, to be met with in *Spirobranchus*—only in this latter they are perforated, and are soon destroyed when a new one has been formed, so that not more than one is observable at a time. One hundred and thirty-four species are described in Latin, amongst which several new ones, besides a new genus, *Phragmatopoma*, of the family of Hermellæ, which has been described here because it shows some analogy to Serpulidæ, and seems to exhibit a transition from the type of one group to that of another. The paper is accompanied with a very beautiful plate.

In conclusion, a few words may be said on Dr. Bergh's papers, of which the first describes a new genus of Dendronotidæ, which he proposes to call *Campaspe pusilla*, differing from *Dendronotus* principally by the trunks of the dorsal papillæ and the sheaths of the rhinophores being but slightly subdivided, as well as by its teeth. To this is appended an anatomical description of *Doto*, showing, amongst

other things, in opposition to the statements of Souleyet and of Alder and Hancock, that it does possess jaws, which have been overlooked by these authors on account of their being almost colourless, just as they were overlooked by Burmeister in *Phyllodesmium*, where Dr. Bergh has proved their existence on an earlier occasion. The same circumstance has caused Alder and Hancock to overlook the teeth, which are arranged, not as in *Glaucus*, but as in *Dendronotus*, only there are not so many as in *Dendronotus*. Dr. Bergh's second paper gives a careful diagnosis of the family of Pleurophyllidæ, of which he describes a new form, *Sancara quadrilateralis*, Bgh., particularly distinguished by the rhinophores being foliated only on one side. Of this new genus the author gives an anatomical description occupying forty pages, with two plates, of which we shall mention a few details. Dr. Bergh has found spicula in the envelope of several Pleurophyllidæ which were formerly supposed not to possess them. He carefully describes the jaw, which is very like the basal part of the jaw of *Æolidia*, but exhibits nothing parallel to its broad lamelliform part. The outside of this jaw was covered with a peculiar membrane (showing cellulæ of irregular shape, and mostly placed in quincunx, with a clear nucleus)—a covering which the author says that he has found on the jaws of many *Æolidiæ*. The structure of the mouth was like that of *Æolidia*; but the account given of this by Dr. Bergh differs considerably from that by Alder and Hancock. The principal divisions of the liver, after having given off branches to the side folds, seem, according to Dr. Bergh, to terminate near the edge of the mantle, near the urticating cells, which consequently are here placed in the same near vicinity to the last ramifications of the liver, in which Dr. Bergh had discovered them some years ago in *Æolidiæ*. The organs of generation are hermaphroditic, as in all Pleurophyllidæ, those of the different sexes united into one gland.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

Dec. 13, 1864.—John Gould, Esq., F.R.S., in the Chair.

CHARACTERS OF NEW SPECIES OF CRUSTACEANS DISCOVERED
BY J. K. LORD ON THE COAST OF VANCOUVER ISLAND.
BY C. SPENCE BATE, F.R.S.

[The following new species of Crustaceans, collected on the east side of Vancouver Island, were kindly named, described, and figured for me by Mr. Spence Bate. Some of them were dredged in from 8 to 10 fathoms of water; the rest were collected between tide-marks.

Mr. Spence Bate says, in speaking of the collection generally, "The extremely opposite and varied localities in which many of the species here represented have hitherto been found, suggest the idea that Vancouver Island corresponds with the extreme limit between a